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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/627,421	07/27/2000	Atsushi Murashima	017446/0305q	1185

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EXAMINER

AZAD, ABUL K

ART UNIT	PAPER NUMBER
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2654

DATE MAILED: 02/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/627,421

Applicant(s)

MURASHIMA, ATSUSHI

Examiner

ABUL K. AZAD

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 July 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3. 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to application filed on July 27, 2000.
2. Claims 1-20 are pending in this action.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

4. The reference cited in the Information Disclosure Statement IDS-PTO-1449, Paper NO. 2 and 3 have been considered.

Specification

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: IDENTIFYING VOICED SPEECH AND UNVOICED SPEECH USING DECODED INFORMATION TO PRODUCE RECONSTRUCTED SPEECH SIGNAL OF ENHANCED QUALITY.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4, 7, 8, 10-13, 16, 17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted prior art in view of Su et al. (US 6,122,611).

As per claim 1, Admitted prior art teaches, "a speech signal decoding method comprising the steps of":

"decoding information containing at least a sound source signal, a gain, and filter coefficients from a received bit stream" (Fig. 4, element 10 encoded data, which contains sound source signal, a gain and filter coefficients from the bit stream);

"performing smoothing processing based on the decoded information for at least either one of the decoded gain and the decoded filter coefficients in the unvoiced speech"(Fig. 4, element 1120, second gain decoding circuit and element 1020, LSP (filter coefficients) decoding circuit); and

"decoding the speech signal by driving a filter having the decoded filter coefficients by an excitation signal obtained by multiplying the decoded sound source signal by the decoded gain using a result of the smoothing processing" (Fig. 4, element 1020, LSP decoding circuit and element 1110, first gain decoding circuit).

Admitted prior art does not explicitly teach, "identifying voiced speech and unvoiced speech of a speech signal using the decoded information". However, Su

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teaches, "identifying voiced speech and unvoiced speech of a speech signal using the decoded information" (Fig. 5, element 506, voice activity detector, where voice activity detector identify voiced speech and unvoiced speech signal using the decoded information, more details at col. 5, lines 1-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use Su's teaching in the invention of Admitted known art because Su teaches his invention provides out put speech, sounds more natural to the human ear, a person with ordinary skill would readily recognized it as an advantage (col. 5, lines 27-28).

As per claim 2, the claim limitations are rejected based on the rationale given to claim 1 above and further the Admitted prior art teaches, "the step of performing smoothing processing comprises the step of performing smoothing processing in accordance with a classification result of the unvoiced speech for at least either one of the decoded gain and the decoded filter coefficients in the unvoiced speech" (Fig. 4, element 1120, second gain decoding circuit and element 1020, LSP (filter coefficients) decoding circuit).

Admitted prior art does not explicitly teach, "wherein the method further comprises the step of classifying unvoiced speech in accordance with the decoded information". However, Su teaches, "wherein the method further comprises the step of classifying unvoiced speech in accordance with the decoded information" (Fig. 5, element 506, voice activity detector, where voice activity detector classify voiced speech and unvoiced speech signal in accordance with decoded information, more details at

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col. 5, lines 1-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use Su's teaching in the invention of Admitted known art because Su teaches his invention provides out put speech, sounds more natural to the human ear, a person with ordinary skill would readily recognized it as an advantage (col. 5, lines 27-28).

As per claims 3 and 4, the claim limitations are rejected based on the rationale given to claim 1 and 2 above and further the Admitted prior art does not explicitly teach, "wherein the identifying/classifying step comprises the step of performing identification/classification operation using a value obtained by averaging for a long term a variation amount based on a difference between the decoded filter coefficients and their long-term average". However, admitted prior art teaches, a smoothing coefficient calculation circuit 1310 calculates an LSP variation amount $d_0(m)$ for each subframe m (voiced subframe and unvoiced subframe) using a value obtained by averaging for a long term a variation amount based on a difference between the decoded filter coefficients and their long-term average (specification, Page 6, line 17 to Page 7, line 11). Su teaches voice activity detector identify/classifying voice and non-voiced part based on the decoded linear predictive coefficients (col. 5, lines 1-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use LSP variation amount $d_0(m)$ for identifying/classifying voiced subframe and unvoiced subframe so that voiced and unvoiced classification perfectly obtained.

As per claims 10-13, they are interpreted and thus rejected for the same reasons set forth in the rejection 1-4, because claims 10-13 are directed towards a speech signal decoding apparatus rather than a method, essentially have similar limitations and scope.

As per claims 7 and 8, the claim limitations are rejected based on the rationale given to claim 1 and 2 above and further the Admitted prior art does not explicitly teach, "the step of estimating pitch periodicity and power of the speech signal from the excitation signal and the decoded speech signal, and the identification/classifying step comprises the step of performing identification/classification operation using at least either one of the estimated pitch periodicity information and the estimated power". However, Su teaches, "the step of estimating pitch periodicity and power of the speech signal from the excitation signal and the decoded speech signal, and the identification/classifying step comprises the step of performing identification/classification operation using at least either one of the estimated pitch periodicity information and the estimated power" (col. 5, lines 1-19, particularly reads on "the speech signal 414 includes coded linear prediction coefficient, pitch coefficients, fixed excitation code words and energy . . . decoder circuit 502 transmits synthesized speech signal to both adder circuit and the voice activity detector (VAD) circuit" where VAD circuit identifying/classifying the voiced speech and unvoiced speech based on the decoded information, in order to determine voiced and unvoiced speech VAD inherently estimating pitch periodicity and power of the decoded speech signal). Therefore, it

would have been obvious to one of ordinary skill in the art at the time of the invention to use Su's teaching in the invention of Admitted known art because Su teaches his invention provides out put speech, sounds more natural to the human ear, a person with ordinary skill would readily recognized it as an advantage (col. 5, lines 27-28).

As per claims 16 and 17, they are interpreted and thus rejected for the same reasons set forth in the rejection 7 and 8, because claims 16 and 17 are directed towards a speech signal decoding apparatus rather than a method, essentially have similar limitations and scope.

As per claims 19 and 20, Admitted prior art teaches, "a speech signal decoding/encoding method/apparatus comprising the steps of":

"encoding a speech signal by expressing the speech signal by at least a sound source signal, a gain, and filter coefficients" (Fig. 5, elements 5110, 6220, 6120, 5520);

"decoding information containing a sound source signal, a gain, and filter coefficients from a received bit stream" (Fig. 4, element 10 encoded data, which contains sound source signal, a gain and filter coefficients from the bit stream);

"performing smoothing processing based on the decoded information for at least either one of the decoded gain and the decoded filter coefficients in the unvoiced speech" Fig. 4, element 1120, second gain decoding circuit and element 1020, LSP (filter coefficients) decoding circuit) ; and

“decoding the speech signal by driving a filter having the decoded filter coefficients by an excitation signal obtained by multiplying the decoded sound source signal by the decoded gain using a result of the smoothing processing” (Fig. 4, element 1020, LSP decoding circuit and element 1110, first gain decoding circuit).

Admitted prior art does not explicitly teach, “identifying voiced speech and unvoiced speech of a speech signal using the decoded information”. However, Su teaches, “identifying voiced speech and unvoiced speech of a speech signal using the decoded information” (Fig. 5, element 506, voice activity detector, where voice activity detector identify voiced speech and unvoiced speech signal using the decoded information, more details at col. 5, lines 1-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use Su’s teaching in the invention of Admitted known art because Su teaches his invention provides out put speech, sounds more natural to the human ear, a person with ordinary skill would readily recognized it as an advantage (col. 5, lines 27-28).

8. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted prior art and Su (US 6,122,611) as applied to claims 2 and 11 above, and further in view of Well-known prior art (MPEP 2144.03).

As per claims 9 and 18, the claim limitations are rejected based on the rationale given to claim 2 above and further Su teaches, “wherein the classifying step comprises the step of classifying unvoiced speech by comparing a value obtained by the decoded filter coefficients” (col. 5, lines 1-19, particularly reads on “the speech signal 414

includes coded linear prediction coefficient, pitch coefficients, fixed excitation code words and energy . . . decoder circuit 502 transmits synthesized speech signal to both adder circuit and the voice activity detector (VAD) circuit" where VAD circuit identifying/classifying the voiced speech and unvoiced speech based on the decoded information). However, Admitted prior art and Su do not explicitly teach, "wherein the classifying step comprises the step of classifying unvoiced speech by comparing a value obtained by the decoded filter coefficients with a predetermined threshold". Official Notice is taken on the well-known threshold value of filter coefficient. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a predetermined threshold value of decoded filter coefficients to determine unvoiced speech so that perfectly unvoiced speech can be detected based on the predetermined threshold value.

9. Claims 5, 6, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted prior art in view of Su et al. (US 6,122,611) as applied to claims 1, 2, 10 and 11 above, and further in view of Aoyagi et al. (US 5,752,223).

As per claims 5 and 6, the claim limitations are rejected based on the rationale given to claim 1 above and further the Admitted prior art teaches, "wherein the decoding step comprises the step of decoding information containing pitch periodicity and a gain of the speech signal from the received bit stream" (Fig. 4, element 1210 Pitch signal decoding circuit, and elements 1220 and 1120 first and second gain decoding circuits).

Admitted prior art does not explicitly teach, the step of decoding information containing a power of the speech signal from the received bit stream. However, Aoyagi teaches, the step of decoding information containing a power of the speech signal from the received bit stream (Fig. 2, element 118 Power dequantizer). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to decoding power information of the speech signal from the received bit stream so that an optimum decoding of speech signal is obtained.

Admitted prior art and Aoyagi do not teach, "identifying/classifying step comprises the step of performing identification/classification operation using at least either one of the decoded pitch periodicity and the decoded power". However, Su teaches, "identifying/classifying step comprises the step of performing identification/classification operation using at least either one of the decoded pitch periodicity and the decoded power" (col. 5, lines 1-19, particularly reads on "the speech signal 414 includes coded linear prediction coefficient, pitch coefficients, fixed excitation code words and energy . . . decoder circuit 502 transmits synthesized speech signal to both adder circuit and the voice activity detector (VAD) circuit" where VAD circuit identifying/classifying the voiced speech and unvoiced speech based on the decoded information). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use Su's teaching in the invention of Admitted known art because Su teaches his invention provides out put speech, sounds more natural to the human ear, a person with ordinary skill would readily recognized it as an advantage (col. 5, lines 27-28).

As per claims 14 and 15, they are interpreted and thus rejected for the same reasons set forth in the rejection 5 and 6, because claims 14 and 15 are directed towards a speech signal decoding apparatus rather than a method, have essentially similar limitations and scope.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nishiguchi et al. (US 5,848,387) teach, Perceptual speech coding using prediction residuals, having harmonic magnitude codebook for voiced and waveform codebook for unvoiced frames.

Jarvinen et al. (US 5,946,651) teach, Speech synthesizer employing post processing for enhancing the quality of the synthesized speech.

Zinser, Jr. et al. (US 6,098,036) teach, Speech coding system and method including spectral formant enhancer.

Oshikiri et al. (US 6,202,046) teach, Background noise/speech classification method.

Sasaki (US 6,377,915) teaches, Speech decoding using mix ratio table.

Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Abul K. Azad** whose telephone number is **(703) 305-3838**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Marsha D. Banks-Harold**, can be reached at **(703) 305-4379**.

Any response to this action should be mailed to:

Commissioner for Patents

Washington, D.C. 20231

Or faxed to:

(703) 872-9314

(For informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center's Customer Service Office whose telephone number is **(703) 306-0377**.


Abul K. Azad

January 27, 2003